

direction, the key opening of said first locking disc is bounded by third and fourth discrete counter surfaces for engagement selectively by a combination surface of the second set, and the combination surface of the second set corresponding to said first locking disc is provided selectively with one of at least two combination values.

11. A cylinder lock and key combination according to claim 10, wherein said first locking disc has fifth and sixth counter surfaces and seventh and eighth counter surfaces, the counter surfaces serving for the same turning direction being located in pairs diametrically on either side of the turning axis (D') of said first locking disc.

REMARKS

A Schedule of Amendments is submitted herewith.

It is proposed that FIG. 11a of the drawings should be amended in the manner indicated in red in the accompanying copy thereof. If the examiner approves of this amendment, it will be incorporated in a corrected formal drawing which will be filed with the application has been allowed.

The examiner has called for restriction among Group I, claims 1-11; Group II, claims 12-19; and Group III, claims 20-27. Applicant confirms the election of Group I, claims 1-11, with traverse. Traverse is on the ground that two mechanisms that are so related to one another that operation of one mechanism requires use of the other mechanism are a single invention and independent claims to the two mechanisms respectively are permitted in a single patent application. For example, a transmitter and a receiver that are functionally related so that use of one requires use of the other are a single invention and independent claims to a transmitter and a receiver are permitted in a single application. The same applies to a lock and a key that is designed for use with the lock and cannot be used with other locks. Applicant's position in this regard is supported by the claims in Martikainen, U.S. Patent 4,351,172, in which claims 1-19 are directed to a cylinder lock and claims 20-22 are directed to a key. Similarly, Roberts et al, U.S. Patent 3,789,638 contains claims directed to a tumbler assembly for a rotary disc tumbler lock and a key for operating a rotary disc tumbler lock. Dunphy et al, U.S. Patent 4,512,166, contains claims to a lock, a key and a lock and key combination. Applicant

therefore submits that the claims of Group III, drawn to a key, should remain in this application and should be examined with the claims of Group I.

Similar comments apply with respect to Groups II and III, since the key blank of Group I is specifically adapted to form the key of Group III. Applicant therefore submits that the claims of Group II, drawn to a key blank, should remain in this application and should be examined with the claims of Groups I and III.

With regard to the examiner's specific objection to page 4, line 13, the period after "0" does not designate the end of a sentence but indicates that the 0 refers to the combination value. This is consistent with the use at page 13, lines 18-26.

The proposed amendment for FIG. 11a and the amendment for page 17, line 20 remove the examiner's specific objection to page 17, line 20.

With regard to the examiner's specific objection to page 18, line 2, applicant believes that the reference to FIG. 3 is correct. The important point is that the key of FIG. 11a or FIG. 11b does not operate a lock designed for the key of FIG. 3, providing a greater range of possible combinations.

A substitute Abstract is submitted herewith.

Claim 3 has been amended to overcome the rejection under 35 USC 112, first paragraph. In connection with the amendment of claim 3, applicant draws attention to page 3, lines 23-24. Claim 6 has been amended to overcome the examiner's specific objection.

Claim 5 has been amended to overcome the rejection under 35 USC 112, second paragraph.

Claims 1, 5, 6 and 7 stand rejected under 35 USC 102 over Martikainen.

Applicant believes that claim 1 as originally filed distinguishes over Martikainen by reciting that the key opening of at least one code locking disc is bounded by at least two discrete counter surfaces. Applicant submits that it is clear from the context that these two discrete counter surfaces are provided for turning the disc in one direction, particularly since the description in claim 1 of the set of code locking discs refers to a first turning direction and the last subparagraph of the claim 1 refers to the combination surface of the key engaging a selected one of the discrete counter surfaces. In Martikainen, the key opening of a code locking disc has only one counter surface for one operating direction. See, for example, FIG. 10 of Martikainen,

which shows a code locking disc having two stop faces 12, one for each turning direction. FIG. 21 of Martikainen shows a code locking disc having a stop face 12 that is engaged by either of two combination surfaces of a key 60 (FIGS. 22-24 and FIGS. 26-28) for turning the disc in the two opposite turning directions respectively. Contrary to the examiner's assertion, the surfaces 64 shown in FIGS. 25 and 29 of Martikainen are guiding surfaces of the key hole 37 (see column 10, lines 12-18), not stop faces of a code locking disc.

In view of the foregoing, applicant submits that the original claim 1 is not anticipated by Martikainen. Nevertheless, applicant has amended the description in claim 1 of the code locking discs by stating that the code locking disc can be turned in the first turning direction by application of turning force to any one of the discrete counter surfaces of the locking disc, and by amending the last subparagraph of claim 1 to state that the code locking disc is turnable in the first turning direction by a key of which the combination surface corresponding to the first code locking disc has either of at least two combination values. Applicant submits that these limitations make it clear that the two discrete counter surfaces are engaged by the same combination surface of the key, which combination surface has one of at least two combination values.

Since claim 1 is not anticipated by Martikainen, it follows that the dependent claims 5, 6 and 7 are not anticipated by Martikainen.

Applicant has further amended claim 1 so that the claim does not refer simply to the possibility of the combination surface corresponding to a code locking disc being provided with one of at least two combination values but recites first and second locking discs and states positively that the combination surface corresponding to the first locking disc is provided with a first combination value and the combination surface corresponding to the second locking disc is provided with a second combination value. Claim 1 as now amended further states that each code locking disc is turnable by a key of which the corresponding combination surface has either the first combination value or the second combination value but that only a key of which the combination surface corresponding to the first locking disc has the first combination value and the combination surface corresponding to the second locking disc has the second combination value is able to turn the first and second code

locking discs to their respective opening positions. Thus, claim 1 now emphasizes the fact that, for example, both the 1. and 2. combination surfaces of the key shown in FIG. 6 will engage the outer counter surface of the code locking disc 4 shown in FIG. 5b but that only the counter surface having the 1. combination value will turn the locking disc shown in FIG. 5b to its opening position. Consequential amendments have been made to claims 2, 8 and 11 for consistency with claim 1. These amendments are not required to respond to a rejection but are presented in order to define more closely the relationship between the discrete counter surfaces and the combination values.

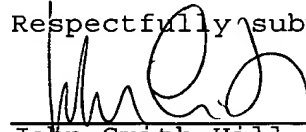
Claims 2-4 and 8-10 stand rejected under 35 USC 103 over Martikainen in view of FitzGerald. The rejection of claims 2-4 and 8-10 depends on the rejection of claim 1 over Martikainen. Since claim 1 is not anticipated by Martikainen, the rejection of claims 2-4 and 8-10 over Martikainen in view of FitzGerald cannot be maintained. In any event, claim 1 clearly distinguishes over Martikainen and FitzGerald, whether taken singly or in combination, and therefore claims 2-4 and 8-10 are patentable over Martikainen and FitzGerald.

FitzGerald discloses a lock having tumbler discs 16 each formed with an opening having at one side three radially and circumferentially spaced stops 21, 22 and 23. The key 10 has bits 24. The height of a given bit determines whether that bit engages the stop 21, the stop 22 or the stop 23 when the key is turned in the lock. If the height of the bit is selected to engage the stop 22, abutment of the bit 24 against the stop 22 prevents the bit 24 from engaging the stop 23 and the bit 24 is of insufficient height to engage the stop 21. Thus, when the key 10 is inserted in the lock and is turned, the bit 24 at the position of a given tumbler disc 16 will engage only one stop of that tumbler disc. Only one variable of the bit, that is its height, affects the combination value of that bit. In accordance with the present invention, the combination surface corresponding to the first locking disc is provided with a first of at least two combination values and the combination values are such that the first code locking disc is turnable in the first direction by a key of which the combination surface corresponding to the first code locking disc has either the first combination value or the second combination value. This feature is not disclosed or suggested by Martikainen or FitzGerald and accordingly claims 2-4 and 8-10 are patentable over Martikainen

and FitzGerald. Neither Martikainen nor FitzGerald discloses or suggests that a given combination surface of the key should be provided with one of two values, and a combination surface having either of these values should be able to turn a code locking disc having a key opening bounded by at least two discrete counter surfaces.

Claim 11 stands rejected under 35 USC 103 over Martikainen in view of FitzGerald and further in view of FI 25618. The disclosure of FI 25618 is essentially the same as that of FitzGerald except that FI 25618 provides bidirectional operation. In FI 25618 as in FitzGerald, the combination value of a particular combination surface is based only on the height of the bit. Thus, in FI 25618, the locking disc allows the key to have one of five different combination values, for engaging the stops 16-20 respectively. In the case of the present invention, the number of combination values is not limited to the number of discrete counter surfaces, because the combination surface corresponding to the first locking disc is provided with a first of at least two combination values and the first and second combination values are such that the first code locking disc is turnable in the first turning direction by a key of which the combination surface corresponding to the first code locking disc has either the first combination value or the second combination value. This feature is not disclosed or suggested by FI 25618. Applicant therefore submits that claim 11 is patentable over Martikainen, FitzGerald and FI 25618, whether taken singly or in combination.

Respectfully submitted,



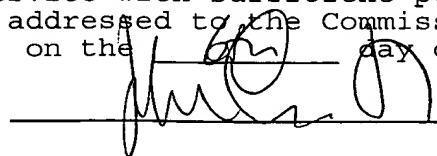
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re Application of

Pekka MIELONEN et al

Art Unit: 3627

Application No: 09/405,436

Examiner:
L. Gall

Filed: September 23, 1999

For: CYLINDER LOCK-KEY-COMBINATION

SCHEDULE OF AMENDMENTS

In the Description:

Page 3, the paragraph beginning at line 16, rewrite as follows:

The technical effect of the solution can further be improved when the key opening of a code locking disc which can be provided with different combination values has two counter surfaces for one turning direction of the key, and the two counter surfaces are angularly spaced from each other about the turning axis of the locking disc and are disposed at different respective angles to the central axis of the key opening of the locking disc so that [their mutual angular pitch is preferably] they are inclined at an angle of about 30°. The central axis of the key opening extends in the plane of the locking disc as distinct from the turning axis of the locking disc, which is perpendicular to the central axis of the key opening and passes through the center of the key opening.

Page 17, the paragraph beginning at line 11, rewrite as follows:

FIGS. 11a, 11b and 11c show three alternative designs of a shank 2b for a key blank and a key to be cut therefrom with alternative combination cuts of the key corresponding to different combination values. In the case of FIGS. 11a and 11b each bevel surface 2e1-2e4 is divided into two parts so that in the embodiment of FIG. 11a the shorter combination surfaces e.g. the 3. and 4. combination surfaces, are not aligned with the longer combination surfaces (the 1. and 2. combination surfaces respectively) but are separated from each other by a step 17, as shown in FIG. 11a between the 1. and 3. combination surfaces. In the case of FIG. 11b the shorter combination surfaces are inclined at a small angle to the longer combination surfaces, as shown particularly for the 2. and 4.

combination surfaces. As a consequence in both these embodiments the angular pitch between cut surfaces corresponding to successive combination values of the key are partly different, but the cooperation between them and the corresponding surfaces in the locking discs 4 (cf. for instance FIG. 4: 4a11, 4a12 etc.) can be arranged such that the mutual angular pitch between the corresponding peripheral notches in the code locking discs 4 remains 15°, whereby the operation of the lock mechanism corresponds to the one described for the embodiment of FIG. 1. Regardless of the design of the central area in the key, i.e. the grooves 2f, and regardless of the combinations, a key in accordance with the arrangement of FIG. 11a will not operate a lock designed for a key in accordance with FIG. 11b and vice versa, and a key in accordance with the arrangement of FIG. 11a or FIG. 11b will not operate a lock designed for a key in accordance with FIG. 3 and vice versa.

In the Claims:

Claims 1, 2, 3, 5, 6, 8, 9, 10 and 11, rewrite as follows:

1. (Amended) A cylinder lock and key combination comprising:
 - a lock body,
 - a turnable lock cylinder located inside the lock body and having an axial slot,
 - a set of code locking discs located inside the lock cylinder, each locking disc having at least one peripheral notch and a key opening and being turnable in the lock body in a first turning direction by application of turning force to a counter surface bounding the key opening, each locking disc having an opening position in which its peripheral notch is at the position of the axial slot in the lock cylinder, such that when all the locking discs are in their respective opening positions the peripheral notches form a uniform channel at the position of the axial slot, the key [opening] openings of at least [one] first and second code locking [disc] discs each being bounded by at least two discrete counter surfaces such that the first code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the first code locking disc and the second code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the second code locking disc,
 - a locking bar having a locking position in which it prevents turning of the cylinder relative to the lock body and a releasing

position in which it is received in the channel formed by the peripheral notches of the locking discs and releases the cylinder for turning relative to the lock body, and

a key insertable in the lock when the locking discs are at an initial position, the key having a set of combination surfaces corresponding respectively to the locking discs, for engaging a counter surface of each locking disc and applying turning force thereto when the key is inserted in the lock and is turned in the first turning direction, so that the locking discs are turned in the first turning direction to their respective opening positions,

and wherein the combination surface corresponding to said [one] first code locking disc [can be] is provided [selectively] with [one] a first of at least two combination values [, whereby the combination surface engages a selected one of the discrete counter surfaces for applying turning force in the first turning direction to said one code locking disc] and the combination surface corresponding to said second code locking disc is provided with a second of said at least two combination values, and the first and second combination values are such that the first code locking disc is turnable in the first turning direction by a key of which the combination surface corresponding to the first code locking disc has either said first combination value or said second combination value and the second locking disc is turnable in the first turning direction by a key of which the combination surface corresponding to the second locking disc has either said first combination value or said second combination value, but only a key of which the combination surface corresponding to the first code locking disc has the first combination value and the combination surface corresponding to the second locking disc has the second combination value is able to turn the first and second code locking discs to their respective opening positions.

2. (Amended) A cylinder lock and key combination according to claim 1, wherein the key opening of said [one] first locking disc has first and second discrete counter surfaces for engagement selectively by the combination surface corresponding to said [one] first locking disc for turning said [one] first locking disc in the first turning direction, and the first and second discrete counter surfaces are arranged at a distance from each other and are located at different respective angles with regard to a central axis (D) of the key opening of said [one] first locking disc.

3. (Amended) A cylinder lock and key combination according to claim 2, wherein the [mutual angular pitch of the] first and second discrete counter surfaces [is] are inclined at an angle of about 30°.

5. (Amended) A cylinder lock and key combination according to claim 1, wherein the key openings of the code locking discs are [at least] substantially identical and are formed so that the combination surfaces of the key engage the respective counter surfaces of the corresponding locking discs only after the key has been turned through a selected angle from the initial insertion position of the key.

6. (Amended) A cylinder lock and key combination according to claim 5, wherein said selected angle is about 15°.

8. (Amended) A cylinder lock and key combination according claim 1, wherein the lock is operable in only one turning direction and the key opening of said [one] first locking disc is bounded by a return surface which cooperates with the key to return said [one] first locking disc to a locking position when the key is turned in a second turning direction, opposite said first turning direction, the return surface being opposite to the counter surfaces with regard to the central axis of said one locking disc.

9. (Amended) A cylinder lock and key combination according to claim 8, wherein said return surface is aligned with one of the counter surfaces of said [one] first locking disc.

10. (Amended) A cylinder lock and key combination according to claim 1, wherein the lock is operable in two turning directions and each locking disc is turnable in a second turning direction, opposite the first turning direction, by application of turning force to a counter surface bounding the key opening, the key has a second set of combination surfaces for engaging a counter surface of each locking disc when the key is turned in the second turning direction, the key opening of said [one] first locking disc is bounded by third and fourth discrete counter surfaces for engagement selectively by a combination surface of the second set, and the combination surface of the second set corresponding to said [one]

first locking disc is provided selectively with one of at least two combination values.

11. A cylinder lock and key combination according to claim 10, wherein said [one] first locking disc has fifth and sixth counter surfaces and seventh and eighth counter surfaces, the counter surfaces serving for the same turning direction being located in pairs diametrically on either side of the turning axis (D') of said [one] first locking disc.